

What is claimed is:

1. An orienting method for an optical polymer film, said polymer film being oriented after passing through at least one processing bath containing a fluid, said 5 orienting method comprising a step of:

removing the fluid, which exists on said polymer film, by using a draining member within 10 seconds from the moment that said polymer film has left said processing bath.

10 2. An orienting method for an optical polymer film according to claim 1, wherein said draining member is disposed at an exit of at least the first processing bath when there are the plural processing baths.

15 3. An orienting method for an optical polymer film according to claim 1, wherein said draining member is disposed at an exit of at least the last processing bath when there are the plural processing baths.

20 4. An orienting method for an optical polymer film according to claim 1, wherein said processing baths, include a cleaning bath for cleaning said polymer film, a dyeing bath for dyeing said polymer film, and a hardening bath for hardening said polymer film.

25 5. An orienting method for an optical polymer film according to claim 4, wherein said polymer film is oriented in a pneumatic atmosphere after passing through said cleaning bath, said dyeing bath, and said hardening bath in order.

6. An orienting method for an optical polymer film according to claim 1, wherein said polymer film is a polyvinyl alcohol film.

7. An orienting method for an optical polymer film, 5 comprising the steps of:

cleaning the strip-form polymer film with a cleaning fluid contained in a cleaning bath through which said polymer film continuously passes;

10 removing said cleaning fluid existing on both surfaces of said polymer film, with first draining blades disposed near a film exit of said cleaning bath;

dyeing said polymer film with a dyeing fluid contained in a dyeing bath through which said polymer film continuously passes;

15 removing said dyeing fluid existing on both surfaces of said polymer film, with second draining blades disposed near a film exit of said dyeing bath;

20 hardening said polymer film with a hardening fluid contained in a hardening bath through which said polymer film continuously passes;

removing said hardening fluid existing on both surfaces of said polymer film, with third draining blades disposed near a film exit of said hardening bath; and

orienting said hardened polymer film in the air.

25 8. An orienting apparatus for an optical polymer film, said polymer film being oriented in a pneumatic atmosphere after passing through at least one processing

bath containing a fluid, said orienting apparatus comprising:

5 a draining member for removing the fluid existing on said optical polymer film, said draining member being disposed near a film exit of said processing bath.

9. An orienting apparatus for an optical polymer film according to claim 8, wherein said draining member includes one of a draining roller and a draining blade.

10. An orienting apparatus for an optical polymer film according to claim 9, wherein said processing baths include a cleaning bath for cleaning said polymer film, a dyeing bath for dyeing said polymer film, and a hardening bath for hardening said polymer film.

11. An orienting apparatus for an optical polymer film according to claim 10, wherein said polymer film is a polyvinyl alcohol film.

12. An orienting apparatus for an optical polymer film, comprising:

20 a cleaning bath for cleaning the strip-form polymer film with a cleaning fluid;

a first draining blades disposed near a film exit of said cleaning bath, said first draining blades removing said cleaning fluid existing on both surfaces of said polymer film;

25 a first rubber-roller pair disposed between the film exit of said cleaning bath and the first draining blades, said first rubber-roller pair nipping said polymer film

and preventing said cleaning fluid from dripping therefrom;

a dyeing bath for dyeing said polymer film with a dyeing fluid;

5 a second draining blades disposed near a film exit of said dyeing bath, said second draining blades removing said dyeing fluid existing on both surfaces of said polymer film;

10 a second rubber-roller pair disposed between the film exit of said dyeing bath and the second draining blades, said second rubber-roller pair nipping said polymer film and preventing said dyeing fluid from dripping therefrom;

a hardening bath for hardening said polymer film with a hardening fluid;

15 a third draining blades disposed near a film exit of said hardening bath, said third draining blades removing said hardening fluid existing on both surfaces of said polymer film;

20 a third rubber-roller pair disposed between the film exit of said hardening bath and the third draining blades, said third rubber-roller pair nipping said polymer film and preventing said hardening fluid from dripping therefrom; and

25 a tenter apparatus for orienting said hardened polymer film in the air.

13. An orienting apparatus according to claim 12, wherein said first through third draining blades

respectively include a front blade for contacting with the front of said polymer film, and a back blade for contacting with the back of said polymer film, said front blade and said back blade being disposed at different 5 positions in a conveyance direction of said polymer film.

14. An orienting apparatus according to claim 13, wherein said front blade and said back blade have a toe formed in an arc shape whose radius is 0.1 to 1 mm, and surface roughness of the toe is 5S or less.

10 15. An orienting apparatus according to claim 14, wherein said first through third rubber-roller pairs have hardness of 50 degrees to 90 degrees and surface roughness of 0.5S to 10S, and linear pressure of nip thereof is 100N/m to 500N/m.

15 16. A tenter apparatus in which a strip-form polymer film, both side edges of which are held by openable clamps, is conveyed along a first rail and a second rail to stretch a width thereof, said tenter apparatus comprising:

20 gripping-force aid means for applying a force in a closed direction of said clamp, said gripping-force aid means being disposed within a range running from a grip commencement position of the clamp to a grip release position of the clamp.

25 17. A tenter apparatus according to claim 16, wherein orienting areas for performing plural sorts of orientation are formed between said first rail and said

second rail, said gripping-force aid means being disposed within at least one of said orienting areas.

18. A tenter apparatus according to claim 16, wherein said first rail and said second rail include a linear portion and a curving portion bending in an arc shape, 5 said gripping-force aid means being disposed in front and in rear of said curving portion.

19. A tenter apparatus according to claim 16, wherein said gripping-force aid means is disposed at a position 10 prior to thermal processing.

20. A tenter apparatus for stretching a width of a strip-form polymer film, comprising:

a plurality of clips movable in a closed direction and an open direction, said clip gripping a lateral end 15 of said polymer film when moving in the closed direction, and said clip releasing the lateral end of said polymer film from a grip when moving in the open direction;

first and second endless moving means oppositely disposed, the respective endless moving means holding 20 said clips at predetermined intervals and moving at a constant speed;

first and second rails disposed in association with said first and second endless moving means so as to form a conveyance passage of said polymer film, said first 25 and second rails defining a movement locus of the respective clips when the respective clips are moved by said first and second endless means in a conveyance

direction of said polymer film, gripping the lateral end of said polymer film; and

gripping-force aid means disposed somewhere along said movement locus defined by said first and second rails,
5 said gripping-force aid means pressing the respective clips in the closed direction to increase a force for gripping said lateral end.

21. A tenter apparatus according to claim 20, wherein said conveyance passage of the polymer film has an entrance 10 portion, a midway portion for orienting said polymer film, and an exit portion;

said first rail and said second rail are parallel at the entrance portion and the exit portion;

15 a width of said exit portion is wider than a width of said entrance portion, and said exit portion inclines relative to said entrance portion;

an inclination of said first rail relative to said entrance portion is larger than that of said second rail at a former half of said midway portion; and

20 said first rail connects in a first arc of a larger arc-angle and said second rail connects in a second arc of a smaller arc-angle, at a latter half of said midway portion and said exit portion.

22. A tenter apparatus according to claim 21, wherein 25 said clip comprises:

a U-shaped frame having a holding surface on which a side edge of said polymer film is placed; and

a flapper rotatably attached to said frame, said polymer film being held by a bottom surface of said flapper and said holding surface of said frame.

23. A tenter apparatus according to claim 22, wherein
5 said gripping-force aid means comprises:

a close cam for coming into contact with an upper end of said flapper to press said flapper in the closed direction;

10 a shaft having a first-end side to which said close cam is attached;

a bearing for supporting said shaft in a slidable manner;

a stopper attached to a second-end side of said shaft;
and

15 a spring disposed between said bearing and said stopper, said spring adjusting a force of said close cam for pressing the upper end of said flapper.

24. A tenter apparatus according to claim 23, wherein
said gripping-force aid means is disposed in said midway
20 portion and said close cams are arranged along said first
and second rails.

25. A tenter apparatus according to claim 24, wherein
said close cams are disposed at positions corresponding
to said first and second arcs.

25 26. A tenter apparatus according to claim 25, wherein
said polymer film is heated at the entrance portion and
the midway portion in order to easily perform orientation.